Headquarters U.S. Air Force

Integrity - Service - Excellence

FORMER WILLIAMS AIR FORCE BASE

BCT REGULATORY CONFERENCE CALL

27 May 2015

ED_005025_00004678-00001

Headquarters U.S. Air Force

Integrity - Service - Excellence

Site FT002, Fire Training Area

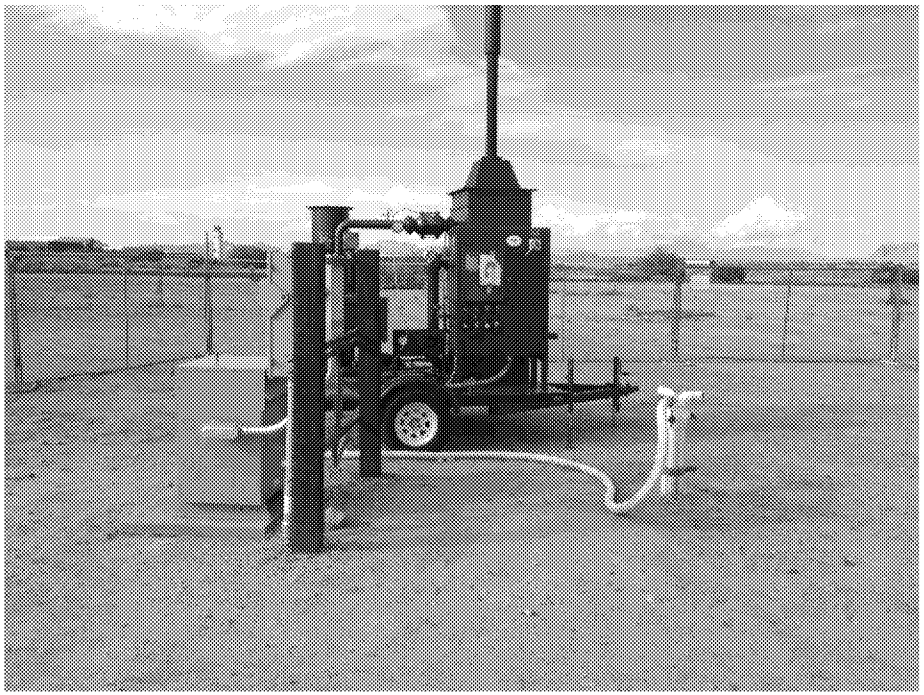
REMEDIAL ACTION

ED_005025_00004678-00002

Site FT002
Soil Vapor Extraction System Update

System Description

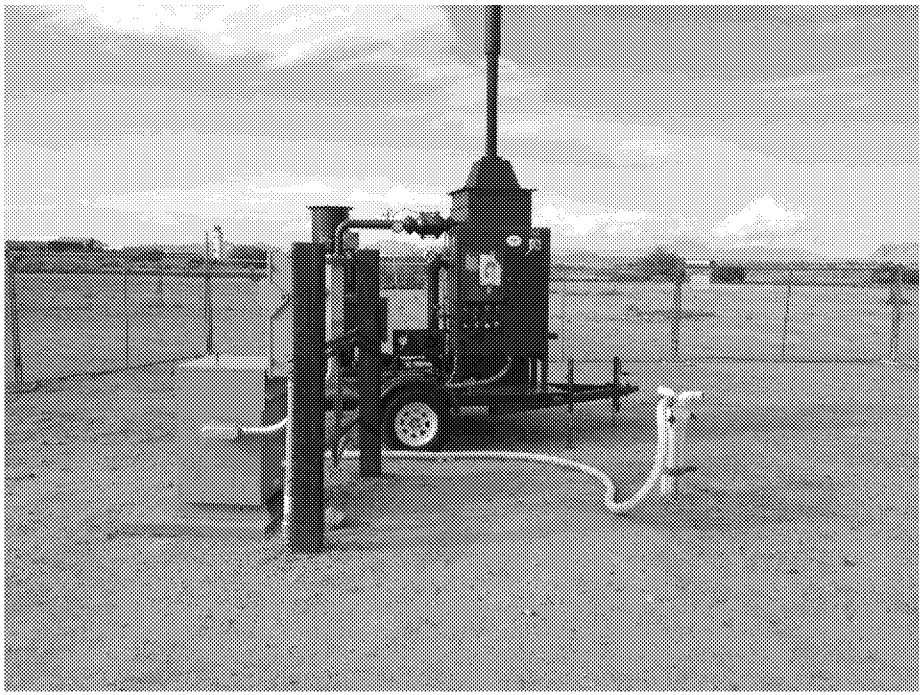
- One nested SVE well with three screen intervals - shallow (S) 14-39 ft, middle (M) 42-57 ft, and deep (D) 60-75 ft
- Treatment system: Combination thermal oxidizer (for concentrations exceeding 2000 ppmv) and electric catalytic oxidizer (for concentrations less than 2000 ppmv)



Site FT002
Soil Vapor Extraction System Update

Jun-Nov 2014 Operation

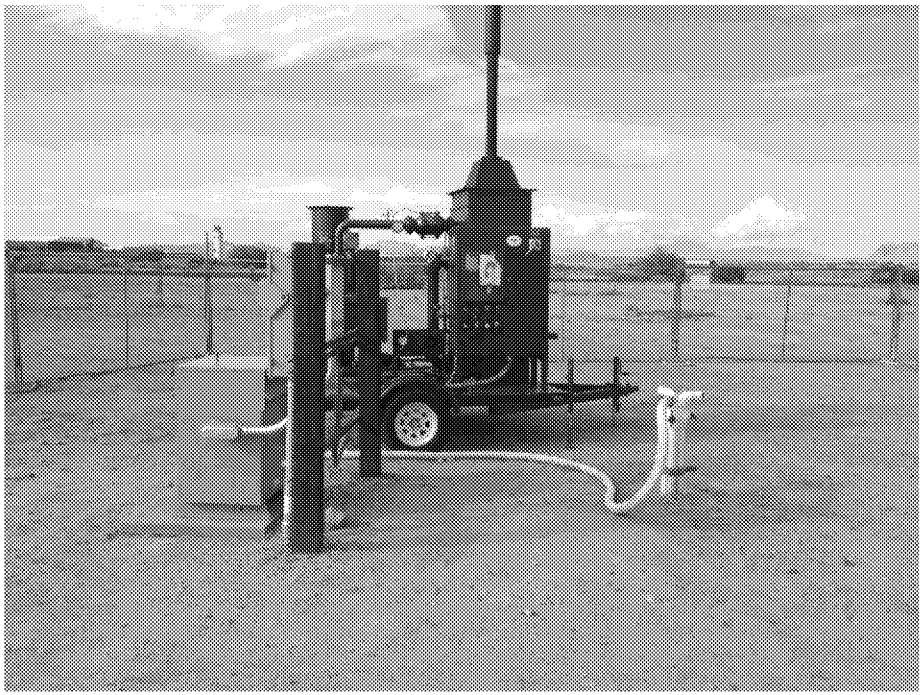
- Run time > 95%
- Operated in thermal oxidizer mode 2 Jun - 7 Jun 2014 initially on SVE-1D and then SVE-1M
- Operated in catalytic oxidizer mode initially on SVE-1D and then SVE-1M from 2 Jul 2014 – 25 Nov 2014 (dilution to below 2000 ppmv required):
  - Dilution valve 73% closed on 31 Oct 2014 (average flow rate 43 scfm)
  - Dilution valve 75% closed on 14 Nov 2014 (average flow rate 44 scfm)
  - Dilution valve 78% closed on 21-25 Nov 2014 (average flow rate 38 scfm)



Site FT002
Soil Vapor Extraction System Update

Dec 2014 Operation

- Due to asymptotic COC concentrations and decreased flow rate for SVE-1M, switched to SVE-1S on 25 Nov 2014
  - Dilution valve 70% closed on 1 Dec 2014
  - Dilution valve 80% closed on 3 Dec 2014 (PID = 991 ppmv)
  - Dilution valve 85% closed on 5 Dec 2014 (PID = 1044 ppmv)
  - Dilution valve 87% closed on 12 Dec 2014 (average flow rate 117 scfm, PID = 1094 ppmv)
- TO-15 sample collected from SVE-1S on 12 December 2014



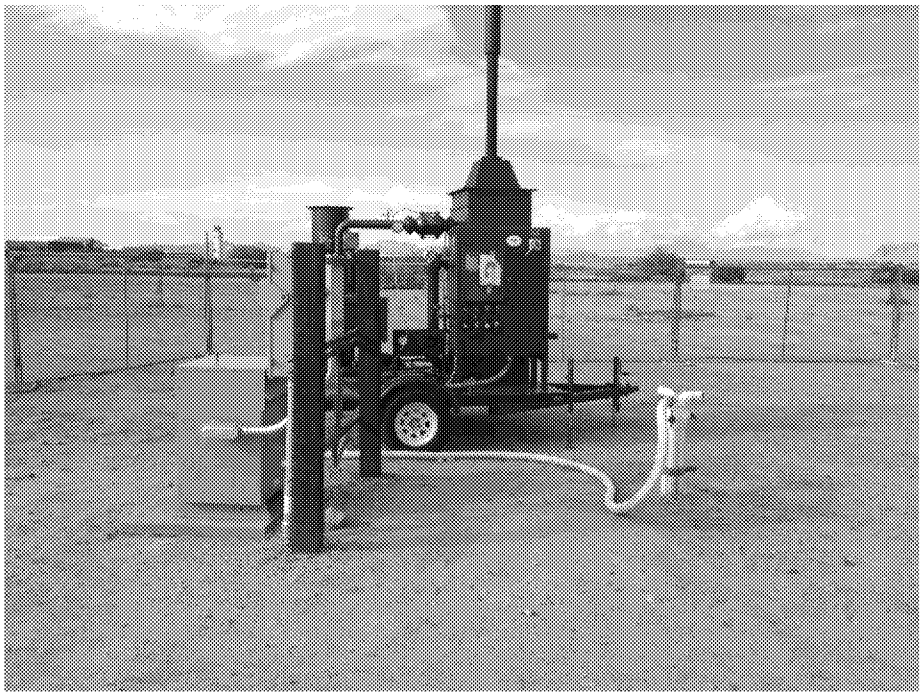
Dec 2014 sample results SVE-1S

Benzene	0.2 ppmv (RL)
Ethyl benzene	16 ppmv
Toluene	21 ppmv
Xylenes	84 ppmv
TMB	11 ppmv

Site FT002
Soil Vapor Extraction System Update

Dec 2014 Operation cont.

- Due to decreasing PID readings for SVE-1S switched to SVE-1D for three week testing period, 12 Dec 2014 – 2 Jan 2015
  - Dilution valve 87% closed on 15 Dec 2014 (PID = 1332 ppmv)
  - Dilution valve 85% closed on 2 Jan 2015 (Flow rate = 36 scfm, PID = 1357 ppmv)
  - TO-15 sample collected from SVE-1D on 2 Jan 15

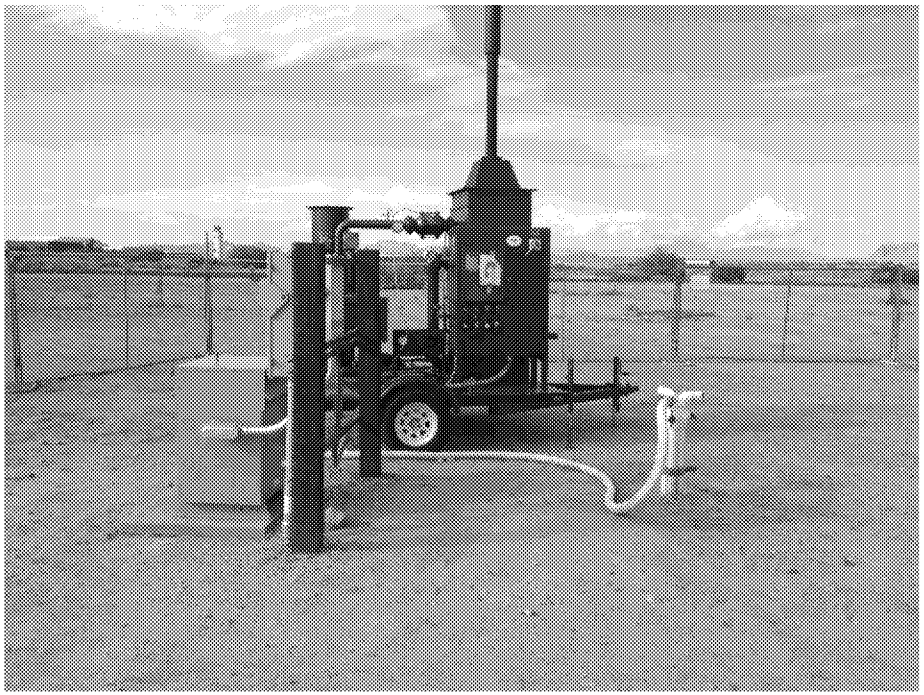


January 2, 2015 sample results SVE-1D	
Benzene	<0.04 ppmv
Ethylbenzene	13.14 ppmv
Toluene	23.7 ppmv
Xylenes	74.53 ppmv
TMB	1.5 ppmv

Site FT002
Soil Vapor Extraction System Update

Jan thru Mar 2015 Operation

- Based on preliminary 12 Dec 2014 analytical results from SVE-1S, switched back to SVE-1S on 9 Jan 2015; highest residual COC concentrations in SVE-1S
- Samples collected from system effluent, influent, and SVE-1S (TO-3 and TO-15 analysis) and VMP-1 and VMP-2 (TO-15) analysis on 30 Jan 2015:
  - Dilution valve 90% closed (Flow rate = 129 scfm, PID = 1006 ppmv)



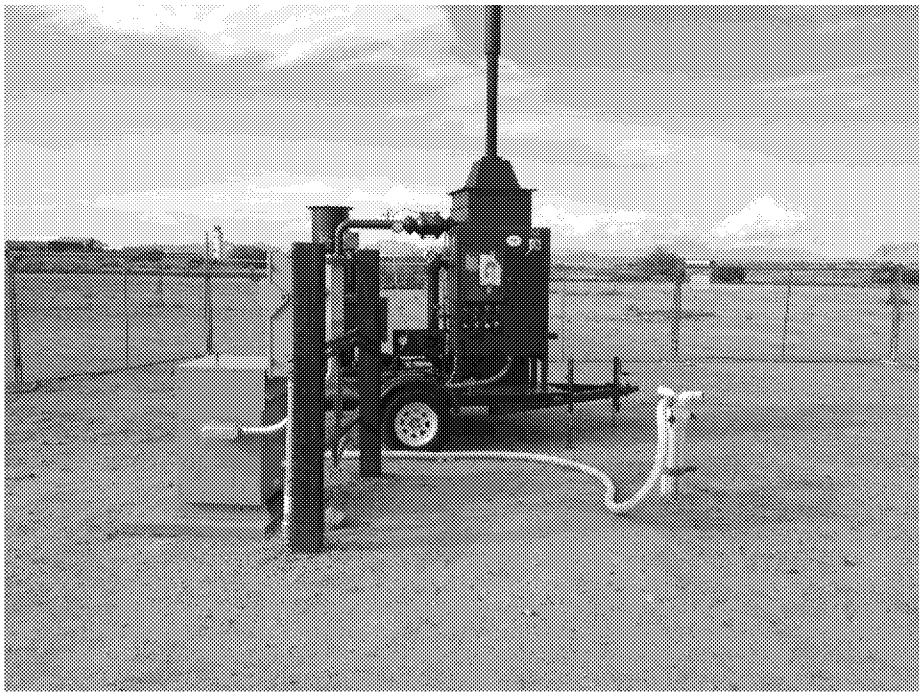
January 30, 2015 sample results SVE-1S	
Benzene	<0.14 ppmv
Ethylbenzene	12.69 ppmv
Toluene	13.31 ppmv
Xylenes	72.05 ppmv
TMB	11.81 ppmv

Site FT002
Soil Vapor Extraction System Update

Jan thru Mar 2015 cont

- Samples collected from SVE-1S, SVE-1M, and SVE-1D (TO-15 analysis) on 13 Feb 2015:
  - Dilution valve 96% closed (Flow rate = 151 scfm, PID = 843 ppmv)

- TO-15 samples collected from system effluent, influent, SVE-1S, VMP-1 and VMP-2 on 27 Feb 2015:
  - Dilution valve 96% closed (Flow rate = 131.5 scfm, PID = 822 ppmv)



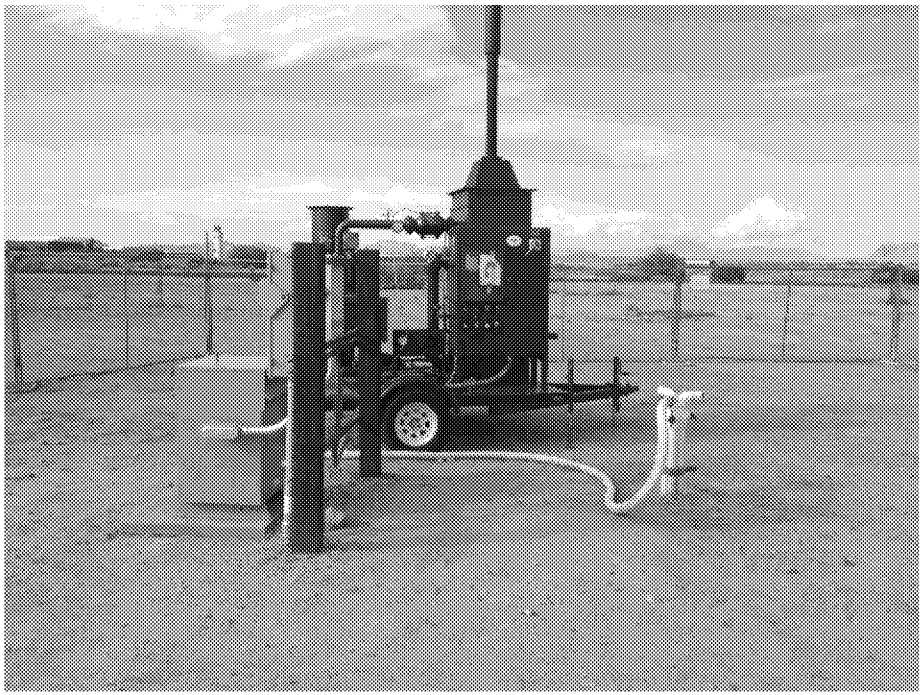
February 27, 2015 sample results SVE-1S	
Benzene	<0.11 ppmv
Ethylbenzene	8.4 ppmv
Toluene	11 ppmv
Xylenes	46 ppmv
TMB	4.8 ppmv

Site FT002
Soil Vapor Extraction System Update

Jan thru Mar 2015

- Sample collected from SVE-1S (TO-15 analysis) on 13 Mar 2015:
  - Dilution valve 96% closed (PID = 705 ppmv)

- Based on observed COC concentrations in Feb at VMPs, switched to SVE-1M on 13 Mar 2015 to extract residual VOCs from middle zone. TO-15 samples collected from system effluent, influent, SVE-1M, VMP-1 and VMP-2 on 27 Mar 2015:
  - Dilution valve 86% closed (Flow rate = 90.5 scfm, PID = 1356 ppmv)



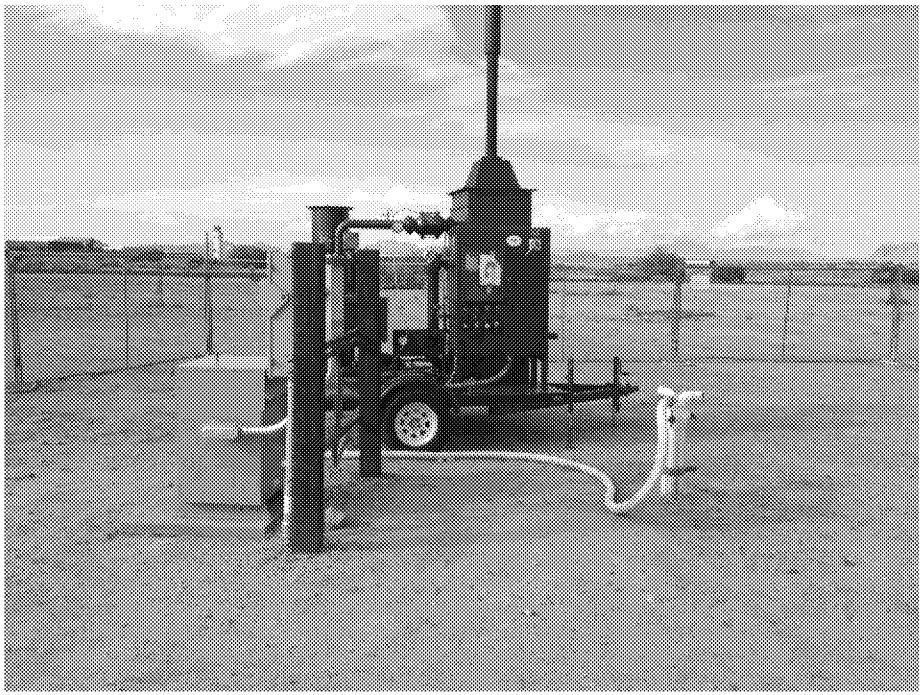
March 27, 2015 sample results SVE-1M	
Benzene	0.048 ppmv
Ethylbenzene	26 ppmv
Toluene	41 ppmv
Xylenes	134 ppmv
TMB	17 ppmv

Site FT002
Soil Vapor Extraction System Update

April 2015

Operated on SVE-1M.

- **TO-15 samples collected from SVE-1M, VMP-1 and VMP-2 on 17 Apr 2015:**
  - **Dilution valve 88% closed (Flow rate = 132 scfm, PID = 1159 ppmv)**



April 17, 2015 sample results SVE-1M	
Benzene	<0.44 ppmv
Ethylbenzene	13 ppmv
Toluene	13 ppmv
Xylenes	63 ppmv
TMB	3.9 ppmv

Site FT002 – Estimated COC Mass Removal

VOC	Estimated pre-SVE mass in soil as total pounds	Mass removed through 5/8/15 as total pounds (since last update)
Benzene	40-45	33.85 (0.17)
Toluene	750	620 (24)
Ethylbenzene	300	194 (16)
Xylene	1700	1066 (167)
Total TMB	800	172 (32)

30’ x 30’ impacted area.
65’ contaminated thickness (10-75 feet bgs).
In-situ soil density of 100 lb/cf.
Average COC concentrations across vertical thickness from June 2013 data

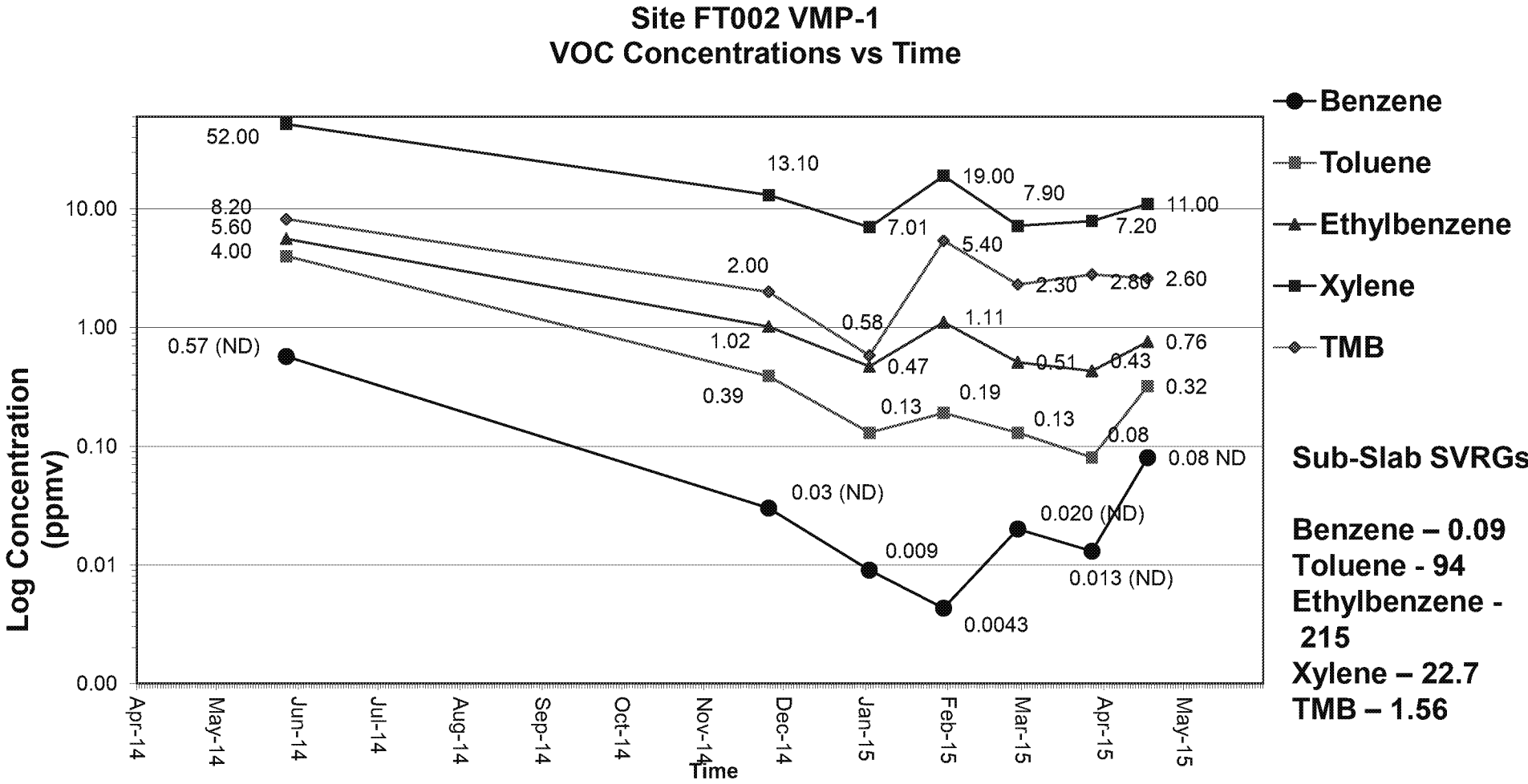
Site FT002
Soil Vapor Remediation Goals

- Johnson-Ettinger Model used to calculate site-specific soil vapor remediation goals (SVRGs) for COCs:

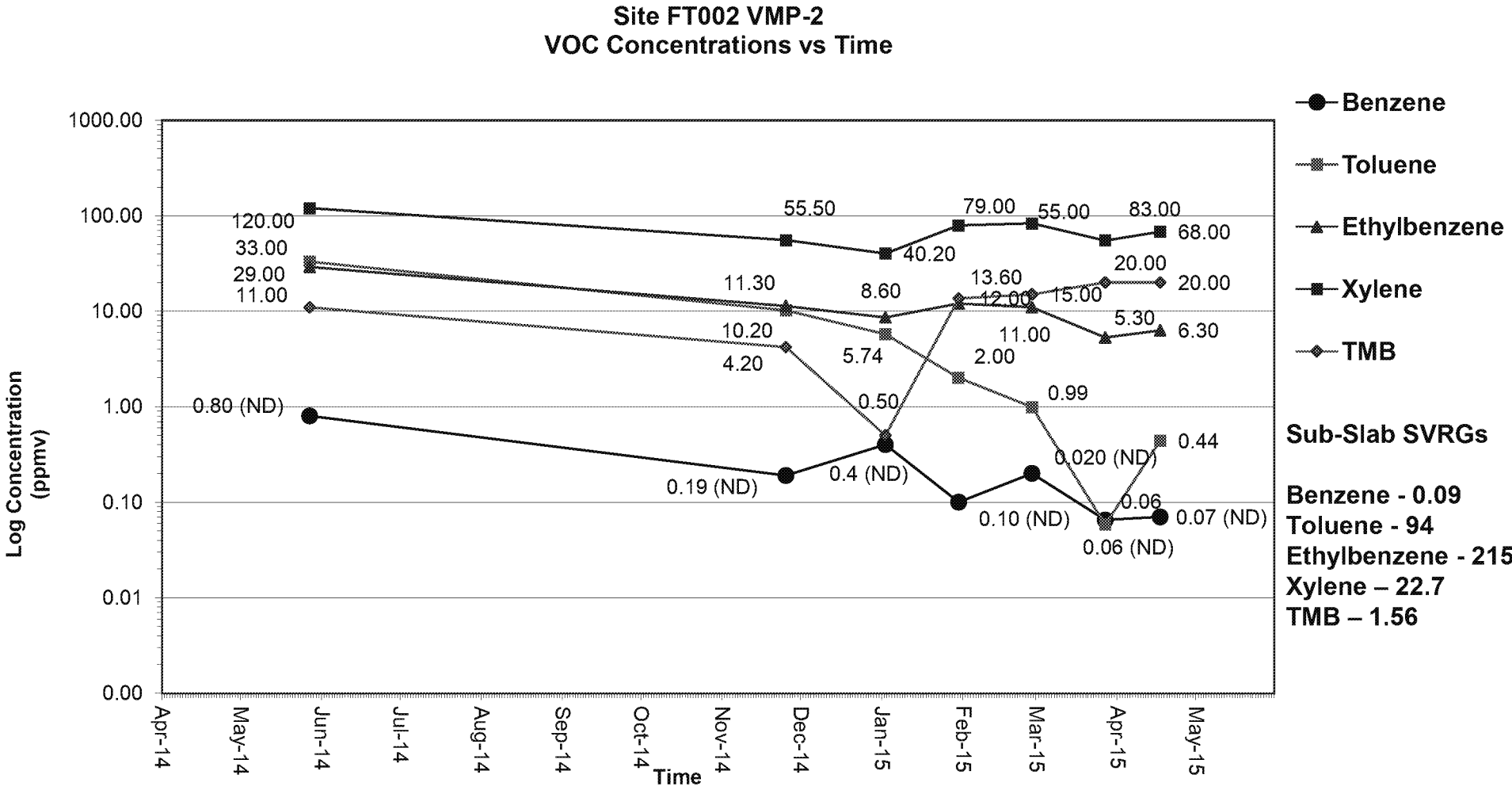
	Soil Vapor Remediation Goals (SVRGs) ppmv			
COC	Sub-Slab SVRG[1]	Shallow SVRG[1]	Middle SVRG[1]	Deep SVRG[1]
Benzene	0.09	0.07	0.77	1.08
Toluene	94	78.32	783	1175
Ethylbenzene	215	181.26	1926	2945
Xylene	22.7	19.26	215	317
TMB	1.56	1.20	17	25

1. Site-Specific SVRG calculated by J-E model based on 1E-06 cancer risk for benzene and HQ=1 for non-carcinogens. Ethylbenzene is evaluated as a non-carcinogen.

Site FT002 SVE System Performance – VMP-1



Site FT002 SVE System Performance – VMP-2



Site FT002 Path Forward

- Sub-Slab SVRGs have been achieved for all COCs with the exception of xylene and TMB in VMP-2.
- SVE system was shut down on 5 May 2015 and TO-15 samples were collected from VMP-1 and VMP-2 to evaluate COC concentrations under static conditions. The SVE was re-started on 8 May 2015 on SVE-1M for an additional two week period.
- Based on results, SVE may continue or the system shut down and the rebound testing phase implemented.
  - If TMB concentration at VMP-2 remains above SVRGs, evaluate if additional SVE operation is necessary and if not, proceed to rebound testing.
  - If TMB concentration at VMP-2 is below the SVRG, proceed to rebound testing.

Site FT002 Rebound and Confirmation Sampling Steps

- Shut down SVE system for a minimum one month rebound testing period. Soil vapor samples from the VMPs and SVE wells will be screened to evaluate relative changes in soil gas concentrations

- If rebound testing results do not indicate a potential vapor intrusion risk, then confirmation soil gas is performed

- If confirmation soil vapor samples indicate achievement of vapor intrusion cleanup goals, collect and analyze confirmatory soil samples